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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/468,138	12/21/1999	STEPHEN DOUGLAS PETERS	85773-161	3272

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HARPER, V PAUL	
ART UNIT	**PAPER NUMBER**
2654	13

DATE MAILED: 04/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/468,138	PETERS ET AL.	
	Examiner	Art Unit	
	V. Paul Harper	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,18-27,35 and 36* is/are rejected.

7)☒ Claim(s) *9-17, 28-34, 37 and 38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 9-17, 29, 37, and 38 are objected to because of the following informalities:

- the term "a complex speech model" is introduced in claim 9, line 1; thus, the indefinite article "a" should be removed from the subsequent reference complex speech model in claim 9, line 20.
- the term "a complex speech model" in introduced in claim 28, line 2; thus, the indefinte article "a" should be removed from the subsequence reference complex speech model in claim 29, line 19.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily

published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1-8, 18-27,35, and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by Kuhn et al., (U.S. Patent 6,327,565), hereinafter referred to as Kuhn.

Regarding claims 1, 7 and 35, Kuhn discloses a system for speaker adaptation that includes the following: a new speaker input (col. 5, lines 26-39, Fig. 3, **40**), which corresponds to "an input for receiving an input signal derived from a spoken utterance that contains at least one speech element that potentially matches the given speech element"; a set of HMMs **44** (one for each sound) (col. 5, lines 23-34), which corresponds to "a model group associated to the given speech element, said model group comprising a plurality of speech models, each speech model of said plurality of speech models being a different representation of the given speech element"; with an inherent processing unit to generate an adapted model based in the input and using a linear combination of coefficients (Fig. 3 **52** col. 5, lines 50-57), which corresponds to "a processing unit coupled to the input for processing the input signal and the model group to generate a hybrid speech model associated to the given speech element, said hybrid speech model being weighted a combination of speech models in said plurality of speech models effected on the basis of the input signal derived from the spoken utterance"; and adaptation occurs during recognition with the inherent output of the recognition result from the recognizer (col. 2, lines 45-50), which corresponds to "an

output for releasing a signal indicative of said hybrid speech model associated to the given speech element in a format suitable for use by a speech recognition device."

Regarding claim 2, Kuhn teaches everything claimed, as applied above (see claim 1); in addition, Kuhn teaches the modeling of speech units (such as a phrase, word, subword, phoneme or the like) (col. 3, lines 4-7), which corresponds to "the given speech element is an element selected from the group consisting of phones, diphones, syllables and words."

Regarding claim 3, Kuhn teaches everything claimed, as applied above (see claim 2); in addition, Kuhn teaches the training of a speaker dependent model (one for each sound unit) (col. 5, line 30-33), which corresponds to "input signal derived from a spoken utterance is indicative of a speaker specific speech model associated to the at least one speech element."

Regarding claim 4, Kuhn teaches everything claimed, as applied above (see claim 3); in addition, Kuhn teaches the creation of a new speaker dependent model (col. 5, lines 22-57), which corresponds to "hybrid speech model is weighted toward the speaker specific speech model."

Regarding claim 5, Kuhn teaches everything claimed, as applied above (see claim 4); in addition, Kuhn teaches that the speaker dependent model serves to estimate the linear combination of coefficients that will comprise the adapted model **44** (col. 5, 50-57), which corresponds to "said hybrid speech model is derived by computing a linear combination of the speech models in said model group."

Regarding claim 6, Kuhn teaches everything claimed, as applied above (see claim 5). In addition, Kuhn teaches the following: the use of an iterative process where multiple speaker dependent inputs can be used during training (col. 5, lines 22-58, in particular lines 54-58), which corresponds to "a first input and wherein said input signal is a first input signal, said apparatus further comprising: a) a second input for receiving a second input signal conveying a data element identifying the given speech element"; speaker dependent and speaker independent HMMs (models) for each sound unit (col. 4, lines 40-46), which corresponds to "b) a database of model groups comprising a plurality of model groups, each model group being associated to a respective speech element, each model group comprising a set of speech models"; and the construction of a new model for the for a given sound (in the supervisor mode) (col. 5, lines 22-58, in particular lines 33-36), which corresponds to "said processing unit being further operative for extracting from said database of model groups a certain model group associated to the data element received at said second input identifying the given speech element."

Regarding claim 8, Kuhn discloses an algorithm (Fig. 3) for speaker adaptation inherently implemented with a computational unit that includes the following: a new speaker input (col. 5, lines 26-39, Fig. 3, **40**), which corresponds to "an input for receiving an input signal derived from a spoken utterance that contains at least one speech element that potentially matches the given speech element"; a set of HMM's **44** (one for each sound) inherently stored in a memory (col. 5, lines 23-34), which corresponds to "a memory unit for storing a model group associated to the given speech

element, said model group comprising a plurality of speech models, each speech model of said plurality of speech models being a different representation of the given speech element"; with an inherent processing unit to generate an adapted model based in the input and estimating a linear combination of coefficients to comprise the adapted model (Fig. 3 **52** col. 5, lines 50-57), which corresponds to "a processing unit coupled to the input for processing the input signal and the model group to generate a hybrid speech model associated to the given speech element, said hybrid speech model being a weighted combination of speech models in said plurality of speech models effected on the basis of the input signal derived from the spoken utterance"; the adaptation of the models during recognition (col. 2, lines 45-50) with the inherent release of the recognition result, which corresponds to "an output for releasing a signal indicative of said hybrid speech model associated to the given speech element in a format suitable for use by a speech recognition device."

Regarding claim 18, Kuhn teaches techniques and algorithms for speaker adaptation based on eigenvoices using multiple model groups (Fig. 3, **44 48 52**) where the model groups contain HMMs that can be used to represent phrases, words, subwords, or phonemes (col. 3, lines 4-8) and inherently implemented on a computational device, which corresponds to "a first data structure for storing a plurality of model groups, each model group being associated to a respective speech element in a phonetic alphabet, each model group comprising a plurality of speech models, each model group being suitable for use by a processing device"; and an adapted speech model derived from the speaker dependent model based on an estimate of the linear

combination of coefficients (col. 5, lines 25-57) and inherently implemented on a computational device, which corresponds to "a second data structure for storing a hybrid speech model associated to a given speech element, said hybrid speech model being a weighted combination of speech models of the first type in said plurality of speech models effected on the basis of an input signal derived from a spoken utterance that contains at least one speech element that potentially matches the given speech element."

Regarding claim 19, Kuhn teaches everything claimed, as applied above (see claim 18); in addition, Kuhn teaches that the speech units can be phrases, words, subwords or phonemes or the like (col. 3, lines 4-7), which corresponds to "the given speech element is indicative of a data element selected from the set consisting of phones, diphones, syllables and words."

Regarding claim 20, Kuhn teaches everything claimed, as applied above (see claim 19); in addition, Kuhn teaches the use of a data structure with multiple model groups with the adapted model being the most highly processed (Fig. 3, **44 48 52**, col. 5, lines 23-58), which corresponds to "wherein each model group comprises two sets of speech models namely a first set having a plurality of speech models of a first type and a second set having a plurality of speech models of a second type, each speech model of a first type in said first set being associated to a speech model of the second type in the second set, each speech model of the second type being indicative of a speech model having a higher complexity than a speech model of the first type to which the speech model of the second type is associated."

Regarding claim 21 and 36, Kuhn discloses an adaptable speech recognition system (col. 2, lines 45-50) with the following features: a speaker input (Fig. 3 **40**) which when in supervised mode knows the content of an input in advance (col. 5, lines 33-36), which corresponds to "an input for receiving an input signal indicative of a spoken utterance that is indicative of at least one speech element"; procedures for training of a speaker dependent recognizer (Fig. 3 **42 44**, col. 5, lines 39-49), which corresponds to "a first processing unit coupled to said input operative for processing the input signal to derive from a speech recognition dictionary at least one speech model associated to a given speech element that constitutes a potential match to the at least one speech element"; procedures to construct an adapted model based on a supervector (Fig. 3 **46 48 38,** col. 5, lines 50-57), which corresponds to "a second processing unit coupled to said first processing unit for generating, using a predefined weighting constraint, a modified version of the at least one speech model or the basis of the input signal"; and procedures to construct a new set of HMMs based on the supervector (Fig. 3, **50 52**), which corresponds to "a third processing unit coupled to said second processing unit for processing the input signal on the basis of the modified version of the at least one speech model to generate a recognition result indicative of whether the modified version of the at least one speech model constitutes a match to the input signal"; and since Kuhn's system is a recognition system that automatically adapts during recognition (col. 2, lines 45-50), Kuhn's system inherently releases recognition results, which corresponds to "an output for releasing a signal indicative of the recognition result."

Regarding claim 22, Kuhn teaches everything claimed, as applied above (see claim 21); in addition, Kuhn teaches the processing of the input to produce a speaker dependent model of a specific input when in the supervised mode (Fig. 3 **40 42 44**, col. 5, 39-49), which corresponds to "wherein said first processing unit is operative for generating a speaker specific speech model derived on the basis of the input signal, the speaker specific speech model being indicative of the acoustic characteristics of the least one speech element."

Regarding claim 23, Kuhn teaches everything claimed, as applied above (see claim 22); in addition Kuhn teaches that the speaker dependent model **44** serves to estimate the linear combination of coefficients that will comprise the adapted model (col. 5, lines 50-55), which corresponds to "said modified version of the at least one speech model is indicative of a hybrid speech model associated to the given speech element."

Regarding claim 24, Kuhn teaches everything claimed, as applied above (see claim 23). In addition, Kuhn teaches the following: the transfer of data between the procedures (indicated by the arrows in Fig. 3 between elements **42 44** and **46**), which corresponds to "coupling member for allowing data exchange between the first processing unit and the second processing unit, said coupling member being suitable for receiving the speaker specific speech model derived from the input signal"; a model group containing HMMs with models of speech sounds (Fig. 3, col. 5, lines 26-39), which corresponds to "a model group associated to the given speech element, said model group comprising a plurality of speech models, each speech model of said plurality of speech models being a different representation of the given speech

element"; a procedure to construct a new set of HMMs based on the supervector and using a linear combination of coefficients (Fig. 3 **50**, lines 50-57), which corresponds to "a functional unit coupled to the coupling member for processing the speaker specific speech model and the model group to generate the hybrid speech model associated to the given speech element, said hybrid speech model being a weighted combination of speech models in said plurality of speech models effected on the basis of the speaker specific speech model"; and since Kuhn discloses a speech recognition system (col. 2, lines 45-50) it has an inherent means for indicating a particular recognition event on output, which corresponds to "an output coupling member for allowing data exchange between the second processing unit and the third processing unit, said output coupling member being suitable for releasing a signal indicative of the hybrid speech model associated to the given speech element."

Regarding claim 25, Kuhn teaches everything claimed, as applied above (see claim 24); in addition, Kuhn teaches that the dependent model **44** serves to estimate the linear combination of coefficients that will comprise the adapted model (col. 5, lines 50-54), which corresponds to "said hybrid speech model is weighted toward the speaker specific speech model."

Regarding claim 26, Kuhn teaches everything claimed, as applied above (see claim 24); in addition, Kuhn teaches that the dependent model **44** serves to estimate the linear combination of coefficients that will comprise the adapted model (col. 5, lines 50-54), which corresponds to "said hybrid speech model is derived by computing a linear combination of the speech models in said group of speech models."

Regarding claim 27, Kuhn teaches everything claimed, as applied above (see claim 24); in addition, Kuhn teaches the following: transfer of data between the speaker dependent building portion of the model and the adapted model (indicated by arrows in Fig. 3), which corresponds to "a) a second coupling member for allowing data exchange between the first processing unit and the second processing unit, said second coupling member being suitable for receiving a data element identifying the given speech element"; groups of models (Fig. 3 **44 48 52**) containing HMMs of speech sounds (col. 3, lines 3-7, col. 5, lines 50-57), which corresponds to "b) a database of model groups comprising a plurality of model groups, each model group being associated to a respective speech element, each model group comprising a set of speech models"; a procedure **50** for constructing a new set of HMMs based on the supervector **48** that can access the models with the adapted model (Fig. 3 **50 52**), which corresponds to "functional unit being further operative for extracting from said database of model groups a certain model group associated to the data element received at said second coupling member identifying the given speech element."

Allowable Subject Matter

Claims 9-17, 37, 38 are objected to due to minor informalities, but would be allowable if corrected (see §1). It is noted that the closest prior art of record, Kuhn et al. (US Patent 6,327,565) does not teach the generation of a complex speech model that is a combination of speech models of the second type in said plurality of speech models.

Claims 28-34 are objected to due to minor informalities (see §1) and as being dependent upon a rejected base claim, but would be allowable if corrected and rewritten in independent form including all of the limitations of the base claim and any intervening claims. It is noted that the closest prior art of record, Kuhn et al. (US Patent 6,327,565) does not teach the generation of a complex speech model that is a combination of speech models of the second type in said plurality of speech models.

Response to Arguments

3. See Applicant's arguments from page 22 through page 24; in particular that statement on page 23, line 14, that "linear combinations are NOT necessary [sic] weighted combinations."

As stated in the previous response (paper 10, page 19), Kuhn asserts (col. 5, lns. 50-53) that the speaker dependent model serves to estimate the linear combination of coefficients (weighted combination) that will comprise the adapted model (hybrid speech model). It is well-known in the art that a linear combination is a sum (or difference) of elements with coefficients where the coefficients are real numbers that scale the elements (i.e., a weighted combination). This is interpretation supported by the Applicant's statement in the specification where "[t]he linear combination is characterized by a set of parameters indicative of weights associated to speech models ..." (page 14 lines 27-30), which the Examiner maintains supports the interpretation that "a weighted combination" speech models is equivalent to the notion of "a linear combination" of speech models as taught by Kuhn.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 872-9314

Hand-delivered responses should be brought to:

Crystal Park II
2121 Crystal Drive
Arlington, VA.
Sixth Floor (Receptionist)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. V. Paul Harper whose telephone number is (703) 305-4197. The examiner can normally be reached on Monday through Friday from 8:00 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (703) 305-9645. The fax phone number for the Technology Center 2600 is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service office whose telephone number is (703) 306-0377.

V. Paul Harper

VPH/vph
March 22, 2004

RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER